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EXAMINER	
MERTZ, PREMA MARIA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/510,658	PROUDFOOT ET AL.	
	Examiner	Art Unit	
	Prema M. Mertz	1646	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *57-86* is/are pending in the application.

4a) Of the above claim(s) *84-86* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *57-83* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/15/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-56 have been canceled (6/14/07). New claims 57-86 are pending in the instant application.

Election/Restrictions

1. Applicant's election with traverse of original claims 35-53, and elect a MCP protein comprising amino acid substitutions at positions 18 and 19, as numbered on the sequence of mature human MCP-1, in the reply filed on 6/14/2007 is acknowledged.

Applicants argue that previous claims 35-56 have been canceled and Applicants have submitted new claims 57-86, which read on the elected invention. New claims 57-83 which are drawn to the elected MCP-1 mutein and a nucleic acid encoding the MCP-1 mutein will be examined by the Examiner, i.e. the MCP-1 mutein, the nucleic acid encoding the MCP-1 and a process of making the MCP-1 mutein using the nucleic acid will be examined by the Examiner. However, Applicants have additionally submitted new claims 84-86, which are drawn to a method of reducing leukocyte migration and activation by contacting leukocytes with a human MCP-1 antagonist, respectively. These claims encompass distinct inventions for the reasons set forth in the restriction requirement of 3/29/07. Furthermore, with respect subject matter of methods of treatment claims 84-86 (see In re Ochiai (37 USPQ2d 1127 (Fed. Cir. 1995)), in which a new, unobvious material is used in a known process, Ochiai determined that a process was free of the prior art if it employed a product, which was free of the prior art. However, only if the product claims 57-67, 72-83 are found allowable, the subject matter of product claims will be rejoined with the process claims (claims 84-86), if the process claims are of the same scope as the allowable product claims.

The Groups as delineated in the restriction requirement (3/29/07 and 5/14/07) are patentably distinct one from the other such that each invention could, by itself, in principle, support its own separate patent (as shown by the arguments put forth in the written restriction requirement).

The requirement is still deemed proper and is therefore made FINAL.

Claims 84-86, are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

2. A new title of the invention is required because the word "novel" is not considered as part of the title of an invention and the Patent and Trademark Office does not include such words at the beginning of the title of the invention. It is suggested that the word "novel" be deleted from the title of the invention to read "antagonists of human MCP-1 receptor". See MPEP § 606.01.

Claim Rejections - 35 USC § 112, first paragraph

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3a. Claims 57-83 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

Claims 63 and 78 recite "at least 70% homology with human mature MCP-1, MCP-2, MCP-3, MCP-4 or eotaxin" and independent claims 57 and 72 recite "substitutions at positions 18 and 19". Furthermore, claims 61 and 76 recite "in which one or more amino acid residues have been added, deleted, or substituted". With respect to claims 63 and 78, the claims do not require that the mutein polypeptides of the claims possess any particular conserved structure, or other disclosed distinguishing feature. Thus, the claims are drawn to a genus of polypeptides that is defined only by sequence identity. Similarly, claims 57 and 72 recite amino acid substitutions at positions 18 and 19 the resulting proteins having antagonistic activity but only substitutions with alanine at these sites has been described. To provide evidence of possession of a claimed genus, the specification must provide sufficient distinguishing identifying characteristics of the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties, functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof. In this case, the only factor present in the claim is a partial structure in the form of a recitation of percent identity. There is not even identification of any particular portion of the structure that must be conserved for the biological activity of being a MCP-1 antagonist. Accordingly, in the absence of sufficient recitation of distinguishing identifying characteristics and structure/function relationship, the specification does not provide adequate written description of the claimed genus.

Vas-cath Inc. v. Mahurkar, 19 USPQ2d 1111, clearly states that "applicant must convey with reasonable clarity to those skilled in the ad that, as of the filing date sought, he or she was in possession *of the invention*. The invention is, for purposes of the written description' inquiry, whatever is *now claimed*." (See page 1117.) The specification does not "clearly allow persons of

ordinary skill in the art to recognize that (he or she) invented what is claimed." (See *Vas-Cath* at page 1116). As discussed above, the skilled artisan cannot envision the detailed chemical structure of the encompassed genus of polypeptides, and therefore conception is not achieved until reduction to practice has occurred, regardless of the complexity or simplicity of the method of isolation. Adequate written description requires more than a mere statement that it is part of the invention and reference to a potential method of isolating it. The compound itself is required. See *Fiers v. Revel*, 25 USPQ2d 1601 at 1606 (CAFC 1993) and *Amgen Inc. v. Chugai Pharmaceutical Co. Ltd.*, 18 USPQ2d 1016.

One cannot describe what one has not conceived. See *Fiddes v. Baird*, 30 USPQ2d 1481 at 1483. In *Fiddes*, claims directed to mammalian FGF'S were found to be unpatentable due to lack of written description for that broad class. The specification provided only the bovine sequence. Therefore, only a MCP-1 polypeptide of amino acid sequence set forth in SEQ ID NO:3 as recited in claim 65 and a nucleic acid encoding the protein of amino acid sequence set forth in SEQ ID No:3, but not the full breadth of the claims meets the written description provision of 35 U.S.C. 112, first paragraph. Applicant is reminded that *Vas-Cath* makes clear that the written description provision of 35 U.S.C. 112 is severable from its enablement provision (see page 1115).

3b. Claims 57-83, are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated MCP-1 protein comprising the amino acid sequence set forth in SEQ ID NO:3, does not reasonably provide enablement for the MCP-1 proteins recited in claims 57 and 72 and the nucleic acid encoding the proteins. The

specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Claims 57 and 72 recite muteins of MCP-1 with substitutions at amino acid positions 18 and 19. Claims 61 and 76 recite "in which one or more amino acid residues have been added, deleted, or substituted". Claims 63 and 78, which are dependent on claims 57 and 72, respectively, are overly broad in their limitation of "at least 70% homology with human mature MCP-1, MCP-2, MCP-3, MCP-4 or eotaxin" because no guidance is provided as to which of the myriad of MCP-1 protein molecules encompassed by the claims will encode a polypeptide which retains the characteristics of the desired polypeptide i.e. MCP-1 receptor antagonist. Variants of a nucleic acid can be generated by deletions, insertions, and substitutions of nucleotides, but other than substitutions at amino acid positions 18 and 19 in the native MCP-1 protein sequence, no actual or prophetic examples on expected performance parameters of any of the possible variants of the claimed nucleic acid molecule or muteins of the MCP-1 protein molecule have been disclosed. Furthermore, it is known in the art that even single amino acid changes or differences in the amino acid sequence of a protein can have dramatic effects on the protein's function. For example, Mikayama et al. (1993) teaches that the human glycosylation-inhibiting factor (GIF) protein differs from human migration inhibitory factor (MIF) by a single amino acid residue (page 10056, Figure 1). Yet, despite the fact that these proteins are 90% identical at the amino acid level, GIF is unable to carry out the function of MIF, and MIF does not exhibit GIF bioactivity (page 10059, second column, third paragraph). It is also known in the art that a single amino acid change in a protein's sequence can drastically affect the structure of the protein and the architecture of an entire cell. Voet et al. (1990) teaches that a single Glu to Val substitution

in the beta subunit of hemoglobin causes the hemoglobin molecules to associate with one another in such a manner that, in homozygous individuals, erythrocytes are altered from their normal discoid shape and assume the sickle shape characteristic of sickle-cell anemia, causing hemolytic anemia and blood flow blockages (pages 126-128, section 6-3A and page 230, column 2, first paragraph).

There is no guidance provided in the instant specification as to how one of skill in the art would generate and use a polypeptide having at least 70% sequence homology with human mature MCP-1, MCP-2, MCP-3, MCP-4 or eotaxin, other than the polypeptide of SEQ ID NO:3 exemplified in the specification. See *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404. The test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. The factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue" include, but are not limited to: (1) the breadth of the claims; (2) the nature of the invention; (3) the state of the prior art; (4) the level of one of ordinary skill; (5) the level of predictability in the art; (6) the amount of direction provided by the inventor; (7) the existence of working examples; and (8) the quantity of experimentation needed to make or use the invention based on the content of the disclosure.

Given the breadth of the claims, in light of the predictability of the art as determined by the number of working examples, the level of skill of the artisan, and the guidance provided in the instant specification and the prior art of record, it would require undue experimentation for one of ordinary skill in the art to make and use the claimed invention.

3c. Claim 76 is rejected under 35 U.S.C. 112, first paragraph, because the specification,

while being enabling for a host cell in culture transformed with an expression vector comprising a nucleic acid encoding a protein of amino acid sequence as set forth in SEQ ID NO: 3, does not reasonably provide enablement for *in vivo* transfection. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The specification discloses that the nucleic acids of the current invention can be expressed in a wide variety of host cell types, including cells within a host animal (see page 19). However, there are no actual or prophetic examples that disclose how to make or use host cells that comprise a DNA sequence encoding a protein of amino acid sequence as set forth in SEQ ID NO: 3 in an animal. The Examiner cites Eck & Wilson (page 8 1, column 2, second paragraph to page 82, column 1, second paragraph) who report that numerous factors complicate *in vivo* gene expression which have not been shown to be overcome by routine experimentation. These include, the fate of the DNA vector itself (volume distribution, rate of clearance into the tissues, etc.), the *in vivo* consequences of altered gene expression and protein function, the fraction of vector taken up by the target cell population, the trafficking of the genetic material within cellular organelles, the rate of degradation of the DNA, the level of mRNA produced, the stability of the mRNA produced, the amount and stability of the protein produced, and the protein's compartmentalization within the cell, or its secretory fate, once produced. Since the instant disclosure does not address any of the methods necessary to make a host cell in an animal, which comprises the polynucleotide of interest, the claims as written are not enabled. This rejection could be overcome by addition of the limitation wherein the host cells are "isolated".

Claim Rejections - 35 USC § 112, second paragraph

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 57-83 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 57 is rejected as vague and indefinite because of several reasons.

Claim 57 is vague and indefinite because it fails to recite a reference SEQ ID NO for human mature MCP-1 protein. Appropriate recitation of the SEQ ID NO is required.

Claim 57, lines 5 and 10, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 58, line 6, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 63 recites the limitation "MCP proteins" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 64 recites the limitation "MCP proteins" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 68, lines, 5, 10, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 61, lines 1-2, is vague and indefinite because it recites, "one or more amino acid residues have been added, deleted, or substituted". The claim is indefinite because there is no upper limit on the number of amino acid residues, which have been added, deleted, or substituted.

Claim 68, lines 5 and 10, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 69, lines 6 and 11, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 70, lines 6 and 11, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 71, lines 7 and 12, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 72, lines 5 and 10, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claim 73, line 6, is vague and indefinite because it recites "has antagonistic activity to unaltered MCP proteins", which limitation is improper because the MCP protein is a MCP-1 receptor antagonist not a MCP antagonist.

Claims 59-62, 65-67, 74-83, are rejected as vague and indefinite insofar as they depend on the above rejected claims for their limitations.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5a. Claims 57-61, 63-65, 68-76, 78-80, 83, rejected under 35 U.S.C. 103(a) as unpatentable over Hemmerich et al. (1999).

Hemmerich et al teaches mutations in MCP-1 to test the role of the mutations in ligand binding (see abstract; see Figure 3, page 13017). The reference also teaches substitution of

amino acids 18 and 19 in mature wild-type human MCP-1 which muteins resulted in a 2-3 fold decrease in binding affinity (see page 13016, column 2, last line; page 13017, column 1, first line; page 13017, Figure 3; page 13018, Figure 5a) The reference teaches as set forth above but does not teach a human MCP-1 mutein with substitutions at both amino acids 18 and 19 with alanine.

Therefore, it would have been prima facie obvious to one of ordinary skill in the art to modify the nucleic acid encoding the MCP-1 polypeptide as taught by Hemmerich such that it includes mutations in both amino acids 18 and 19 to determine to effect of both mutations together on ligand binding. One of ordinary skill in the art would have been motivated to do so because. Hemmerich teaches that the individual mutants result in a 2-3 fold decrease in binding affinity. Thus the artisan would have expected greater success with the double mutant.

The rejection under 35 USC 103 above is consistent with the case law. Applicants are referred to *In re Kerkoven* (205 USPQ 1069) in which it was shown to be *prima facie* obvious to combine two compositions, each of which is taught by the prior art to be used for that very same purpose. *Ex Parte Quadranti* (25 USPQ2d 1071) also sets forth this precedent, in that the use of materials in combination, each of which is known to function for the intended purpose, is generally held to be *prima facie* obvious. *Ex parte Kucera* (165 USPQ 332) clearly states that synergism has no magical status in rendering otherwise obvious subject matter patentable. Therefore, then, barring unexpected results, one would reasonably expect enhanced, additive, or synergistic activity to be observed by obtaining muteins at both positions 18 and 19 in MCP-1.

5b. Claims 62, 67, 77, 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hemmerich et al. (1999) as applied to claims 57-61, 63-65, 68-76, 78-80, 83, above, and further in view of in view of Capon et al. (U.S. Patent No. 5,116,964).

The Hemmerich reference teaches all as set forth above (see paragraph 5a) but does not teach the MCP-1 protein further comprising a heterologous sequence such as an immunoglobulin constant region.

Capon et al. teaches chimeric proteins for directing ligand binding partners such as growth factors, hormones or effector molecules to cells bearing ligands for the ligand binding partners comprising a ligand binding partner fused to a stable plasma protein which is capable of extending the in vivo half-life of the ligand binding partner when present as a fusion with the ligand binding partner, in particular wherein such a stable plasma protein is an immunoglobulin constant domain (see column 4, lines 57-64; column 5, lines 11-21; column 7, lines 11-27; column 8, lines 13-15).

Therefore, it would have been prima facie obvious to one having ordinary skill in the art to modify the nucleic acid encoding the MCP-1 polypeptide as taught by Hemmerich such that it includes the nucleic acid bonded to a nucleic acid encoding the immunoglobulin constant region to obtain a chimeric protein with an increased circulating half-life, as taught by Capon et al., to obtain the known functions and advantages of the MCP-1 mutein as per the teachings of Hemmerich. Chemokines such as MCP-1 are well-known in the art as having a short half-life. One would have been motivated to obtain a nucleic acid encoding a chimeric protein comprising MCP-1 and immunoglobulin constant domain to decrease the clearance rate of the encoded chimera *in vivo*. Therefore, it would have been obvious to fuse the nucleic acid encoding MCP-1

ligand to the nucleic acid encoding immunoglobulin constant domain, a long-lived molecule well known in the art as able to increase the stability of rapidly cleared molecules.

5c. Claims 66, 81, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hemmerich et al. (1999) as applied to claims 57-61, 63-65, 68-76, 78-80, 83, above, and further in view of Hart (U.S. Patent No. 5,094,941).

Hemmerich et al. teaches all that is recited above (see paragraph 5a) except that Hemmerich et al. does not explicitly teach the labeled MCP-1.

Hart teaches a means of labeling proteins with radioisotopes or imaging agents for diagnostic purposes (including combinations with pharmaceutical carriers for administration of labeled material) or for use in assay methods, respectively (at column 13, paragraphs 2 and 3, lines 25-61). Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching of Hemmerich in view of Hart by labeling the mutein MCP-1 by the method of Hart because labeled MCP-1 administration coupled with radiographic analysis (imaging) is useful for quantitation of the ligand.

Conclusion

No claim is allowed.

Claims 57-83 are rejected.

Advisory Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prema Mertz whose telephone number is (571) 272-0876. The examiner can normally be reached on Monday-Friday from 7:00AM to 3:30PM (Eastern time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Nickol, can be reached on (571) 272-0835.

Official papers filed by fax should be directed to (571) 273-8300. Faxed draft or informal communications with the examiner should be directed to (571) 273-0876.

Information regarding the status of an application may be obtained from the Patent application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Prema Mertz

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Art Unit 1646
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